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Strategic eHealth Planning In Healthcare Organisations In New Zealand: A Telemedicine Perspective

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Abstract

This research reviewed the health IS (HIS) strategy of the New Zealand government and highlighted different gaps in this strategy, as raised by the different stakeholders involved in this strategy. In order to address such gaps, the government provided different Critical Success Factors (CSFs) for the successful implementation of the national HIS strategy. This research introduced the telemedicine technology, as one of the solutions for the HIS strategy with an objective to deliver integrated healthcare services to rural communities specifically. The research assessed the strategic importance of telemedicine by highlighting its Strengths, Weaknesses, Opportunities and Threats (SWOT) to healthcare providers. The research utilised the portrayed HIS strategy and the CSFs to portray a strategy for telemedicine integration in New Zealand taking into consideration its SWOT. The developed CSFs are of strategic importance to healthcare professionals, researchers and policymakers interested in integrating telemedicine in healthcare delivery at the national level in New Zealand and elsewhere.

1 Introduction

In examining the healthcare and disability sector in New Zealand (Al-Qirim, 2003b), it was characterised by a large number of structurally separate service organisations (e.g., primary, secondary, tertiary, and community care providers) who are functionally interdependent in providing an integrated health and disability support service to individuals. Care is provided within an overall framework where the patterns of care services delivered are largely determined by funders and purchasers, who have a duty to meet the needs of the geographic/population they represent in the most effective and efficient ways possible. However, without agreement on how these individual organisations relate and communicate, this current devolved approach could lead to further divisions among these healthcare organisations (NZHIS, 1996). Collaboration and integration is needed to avoid this and to provide appropriate access to seamless coordinated care. Communication between providers and with others in the sector is also important to achieve this coordinated care.

An earlier comprehensive review of information management in the New Zealand health sector was conducted in 1991 (NZHIS, 1996). In early 1995, the 1991 strategy was reviewed and this task has been classed as a key result area (KRA) for the Ministry of

Health (MoH). The New Zealand government pursued three goals toward achieving the integrated healthcare IS strategy (NZHIS, 1996):

i. To improve, maintain, and restoring New Zealander's health, well-being and independence,

ii. To utilise people-centred approaches, and

iii. To utilise resources-effective approaches.

Many significant changes has occurred since the 1991 review with the emergence of comprehensive or managed care as a way of purchasing services. The addition of the Accident Compensation Insurance and Rehabilitation Corporation (ACC) to the range of health purchase agencies further stress the clear shift to a patient or client focus (NZHIS, 1996). While in conceptual terms the future direction appeared relatively clear, the sense of direction was not matched by the reality of the participants' (in the NZHIS (1995a) study) indicated plans for information technology development:

i. Few identified a firm commitment to initiatives that would lead to the electronic sharing of information.

ii. Perceived impediments such as cost, securing third party co-operation, and data security and confidentiality issues were readily identified as a reason for not proceeding.

iii. Respondents indicated that the sector was looking for leadership,

iv. The focus for information management was on business management rather the support for consumer or patient-focused service delivery, and

v. The development and implementation of any strategy was likely to be time consuming and involve significant investment in skill enhancement and technology.

Further focused interviews with the same respondents indicated that in many cases the organisation's strategic information systems plan reflected immediate needs, often based on the historical situation and technology legacies, rather than being firmly based on a clear vision of future direction. Such findings revealed the weakness of the sector in even defining what strategy means and how to plan for information systems.

Accordingly, this research attempts to address such weakness in the strategic planning of information systems by focusing on the telemedicine technology as one possible solution here for healthcare organisations in New Zealand. In the following, the research highlights the strategic importance of telemedicine to healthcare organisations in New Zealand and then suggests a framework for the development of the national telemedicine strategy in healthcare organisations in New Zealand.

2 The Strategic Important Of Telemedicine

The New Zealand studies (NZHIS, 1995a,b; NZHIS, 1996; Neame, 1995) indicated that the health sector is "relatively devolved" with purchasing contracts being the main mechanisms to drive sector wide change at the provider level. Much of the information needed is unavailable in the form needed or at the time that is mostly needed. This in part is related to gaps in the conceptual understanding of service delivery, which is in this sector is a very complex business spanning what has been an extensive range of relatively autonomous functional areas. But it is also due to a lack of reliable information about

outcomes, effectiveness and actual costs on which improvements can be based. Because of this lack of empirical data, the tools for dealing with this complexity, and understanding what happens and why, are deficient (NZHIS, 1996). Various organisational issues and the lack of co-ordination at the national level were also identified. Expertise in health information management and systems is limited. Currently few health and disability sector personnel have the knowledge and skills to understand the issues or to make informed judgements about the validity of the advice they obtain.

The 23 Health and Hospital Services (HHS)[1] existed all over New Zealand are no longer in competition with each other and paid in principal according to the number of people they care for. The competition from the few private hospitals has no effect on them. The ever-lacking government funds (Neame, 1995) is faced with further reduction on the medical portfolio by reducing or eliminating less priority and less life threatening services for the sake of introducing new important ones. With the various gaps existed between the various stakeholders and the lack of a leader (e.g., the government) to co-ordinate between the different HHS resulted in having 23 different information systems that eventually does not interact with one another.

Diminishing funds from the government and cost control has led to the need for alternative and more cost-effective means of providing care (Edelstein, 1999; Neame, 1995). In many cases, this has become necessary for survival (Edelstein, 1999) in order to sustain the increased competition among healthcare providers. The business of healthcare has become so competitive in different countries that many small rural hospitals are trying to align themselves with larger tertiary care centres in a community health-information network, a telemedicine network, or some other type of partnership in order to survive and to retain their local patients (Huston & Huston, 2000). Within these challenges, telemedicine emerge as one possible solution to New Zealand health providers in reaching out to rural patients (Charles, 2000; Harris, Donaldson, & Campbell, 2001), to areas where patient volumes for certain services are limited (Edelstein, 1999), to conduct administrative and clinical meetings, and to conduct different training courses to: patients (smoke treatment centres), doctors, nurses, and other medical staffs (Perednia & Allen, 1995; Wayman, 1994).

Telemedicine means medicine from a distance where distant and dispersed patients are brought closer to their medical providers through the means of telecommunication technologies (Charles, 2000; OTA, 1995; Noring, 2000; Perednia & Allen, 1995; Wayman, 1994). Telemedicine covers a wide spectrum of benefits through the use of telemedicine utilising the video conferencing (TMVC) technology in areas such as consultations, diagnostics, therapeutic, transfer of patient related records, case management, training, and meetings. Researchers envision telemedicine to be an important building block in the strategic plan of many healthcare organizations (Charles, 2000). In a rural setting, telemedicine could help New Zealand health providers in supplying quality, fast, and economical medical services to rural patients and hence, saves doctors and patients valuable time wasted in commuting large distances. Specialists could utilise this extra time in seeing more patients at the main hospital.

In a review of the telemedicine literature, the researcher attempted to identify the strategic importance of telemedicine to healthcare providers by providing a strategic analytical grid based on telemedicine's Strengths, Weaknesses, Opportunities provided and Threats (SWOT) (Table 1).

[1] Recently, hospitals are now the provider arm of the District Health Boards (DHB).

Table 1: *A SWOT Analysis For Telemedicine*

Strength	Weakness
- Ideal in a rural setting (location and time). - Telemedicine could be used in areas such as consultations, diagnostics, therapeutic, transfer of patient related records, case management, training, and meetings. - A medical follow up tool.	- Rapid technological changes, reliability of communication channels, the ability of the technology to provide accurate and high-resolution images and clear voice. - Shifts the doctor's focus from one-on-one practices to one-to-one, via television screens. - Work related hazards resulting from working long periods with video or screen based consultations. - Expensive technology and requires some technical expertise.
Opportunities	**Threats**
- Telemedicine could help health providers in supplying quality, fast, and economical medical services to rural patients and hence, saves doctors and patients valuable time wasted in commuting large distances and hence, increases patient retention in rural areas (Wayman, 1994). Specialists could utilise this saved time in seeing more patients at the main hospital. - Telemedicine represent a more efficient use of existing medical resources, a way to attract patients living outside a hospital's normal service area, a way of bringing international healthcare dollars. - Rural doctors could seek a second opinion from a specialist over the telemedicine technology. - Could video-record session for legal and judicial reviews. - Meeting/Training rural doctors. - Less waiting time for rural patients. - Reduce turnover of medical staff at rural areas they feel isolated from the outside world (Charles, 2000; Harris et al., 2001). - Meeting rural managerial staff and conducting managerial training. - Promote other services through their telemedicine network (i.e., renting the facility to private businesses) (Perednia & Allen, 1995).	- 'Surgeon syndrome' which is conservatism towards all other technologies than one's own was highlighted as an impediment to the adoption of telemedicine (Gammon, 1994). - Few patients are actually being seen through the telemedicine for medical purposes (Perednia & Allen, 1995). The majority of the online time is used for medical education and administration (Wayman, 1994; Perednia & Allen, 1995; Hassol, 1996) - this point needs for further research. - The government's tough position on reimbursement of telemedicine consultations (Grigsby & Allen, 1997; Hassol, 1996). - Justifying cost and sustaining a profitable business model (Hassol, 1996). - Matching technology to medical needs (Perednia & Allen, 1995). - Legal (e.g., restrictions of medical practices across state lines (licensure) and issues of liabilities. - Other legal issues relating to operating a telemedicine network including corporate practice of medicine, patient confidentiality and privacy, malpractice, informed consent, licensure and credentialing, intellectual property, funder's (e.g., Medicare and Medicaid) payment, fraud and abuse, medical device regulation, and antitrust (price fixing) (Edelstein, 1999). - Social issues (e.g., changing physician behaviours and traditional practices and workflow) (Anderson, 1997). - Scheduling of the telemedicine encounters and sessions is another problem where a proper protocol needs to be introduced and accepted. - Some doctors may view telemedicine negatively as they may risk losing a supplementary income paid by the hospital to visit rural areas. Others working in environments characterised by overload and stress will most likely perceive implementing telemedicine as an additional burden.

Thus, the importance of such SWOT analysis to healthcare providers is that they could address the highlighted weaknesses and threats of telemedicine in the light of its strengths and the provided opportunities. It is clear from Table 1 that the telemedicine technology faces many challenges but the severity of such challenges varies from one healthcare provider/country to another.

As a focus, this research is interested in introducing the telemedicine technology as one of the strategic building blocks of the IS strategy in healthcare organisations in New Zealand. In the following, the research examines the status of telemedicine in New Zealand first before providing the agenda for the strategic planning of telemedicine in healthcare organisations in New Zealand from within a set of guidelines identified by the government's strategy.

3 Telemedicine In New Zealand

The information in this section is collected during the period 1999-2000 from different interviews with different healthcare organisations in New Zealand and from one consultant who were involved in introducing telemedicine in one of the healthcare organisations in New Zealand. One of the early initiatives emerged in 1993 in Northland health in transmitting radiology images between two hospitals using leased telephone lines. Telemedicine has been investigated by most of the health providers in New Zealand. The entire crown owned hospitals in New Zealand are managed by regional organisations known as Health and Hospital Services (HHS)[2]. Some HHS has one hospital and others have more than one. In the North Island, Waitemata Health has three video teleconferencing systems. Two of those systems are used in psychiatry and the third one is used in administrative and training purposes (ADMN). Health Waikato has two TMVC systems. Two of these systems are used in dermatology and the third one is used in ADMN. Northland Health Ltd (Whangarei) has two TMVC systems and another two PC-based TMVC. These systems are used in psychiatry and ADMN. Starship Children's Hospital (part of Auckland Healthcare Services) is in the process of establishing a national tele-paediatric network across the 23 HHS and already started with a pilot project. Middlemore Hospital (South Auckland Health) has one group TMVC system for ADMN. Auckland University School of Medicine has one group TMVC system for training purposes and for conducting regular clinical meetings with other CHEs in New Zealand. Lakeland Health LTD has two group video teleconferencing systems for ADMN purposes.

In the South Island, Coast Health Care LTD have three TMVC systems used in paediatrics, psychiatry, and ADMN. Canterbury Health Ltd (Christchurch) has one vide conferencing system for paediatrics and for ADMN purposes. Healthlink South LTD (Christchurch) has two group systems for psychiatry and ADMN. Health South Canterbury Ltd (Timaru), Healthcare Otago LTD, Nelson-Marlborough Health Services LTD, and Southern Health LTD each have one group system. Otago University in Dunedin is using it for training in their school of medicine. It is interesting to know that there is a level of cooperation among CHEs in the south island in the areas of psychiatry and paediatrics.

A stock-take of the TMVC technology in these hospitals reveals that medical schools in New Zealand were among the early adopters and users of the technology. Out of twenty-

[2] Recently, hospitals are now the provider arm of the District Health Boards, e.g., Waikato District Health Board (W-DHB).

three HHS in New Zealand, only twelve have actively adopted telemedicine. The adopted systems ranged between one and four telemedicine systems with the majority of HHS adopting one system only. Those HHS that adopted one telemedicine system use it mostly for general purposes such as managerial meetings, case discussion and occasionally for clinical training. Such initiatives were described as being initial and experimental. Where a HHS owned more than one telemedicine system, it was oriented for clinical purposes such as psychiatry, paediatric, and dermatology areas. Hence, an attempt is made to adopt telemedicine to provide prompt, inexpensive, and quality medical care to geographically dispersed patients, which was otherwise not possible.

4 The Strategic Planning Of IS In Healthcare Organizations In New Zealand: A Telemedicine Perspective

A number of suggestions for the successful implementation of the health information strategy were identified in the Gaps, Overlap, and Issues report (NZHIS, 1995b) above which, could be adopted here as a guiding framework for the development of the national telemedicine strategy in healthcare organisations in New Zealand. Hence, an attempt is made to capitalise on telemedicine's strengths and opportunities and to overcome its weaknesses and threats (Table 1).

i. Funders and purchasers to promote specific directions by using financial incentives and disincentives.

As a novel technology in the healthcare area and due to the limited government funding, healthcare professionals could perceive telemedicine as not a priority medical tool and this could lead to its rejection. Therefore, there is a need to highlight and to populate the SWOT of telemedicine to healthcare providers in order to realise its importance. Some of the suggested solutions:

- Introduce training programmes, seminars and workshops about telemedicine
- Encourage research studies to assess telemedicine effectiveness in healthcare provision (discussed later).
- Provide seed money to initiate telemedicine projects and networks.

As indicated in Table 1 above that one of the major threats to the success of telemedicine was the position of the government and other funding entities on reimbursement of telemedicine consultations. By addressing this threat and providing bigger coverage and support for different types of telemedicine encounters could lead to the large-scale diffusion of telemedicine. Of course, more work is needed to specify which types of encounters that could be prioritised or to be included as part of the funded services.

Telemedicine encourages specialisation and hence, creating one large network, which could link the telemedicine projects existing in the different HHS in New Zealand, could serve those HHS well in serving their patients. This is especially important due to the severe shortage in specialised physicians and other medical staff in New Zealand in general and in rural areas specifically. Thus, promoting the strategic importance of telemedicine at the national level could help in populating the telemedicine technology amongst the different HHS in New Zealand. With the diminishing funds from the government, providing financial incentives to HHS to adopt telemedicine and to uplink with other HHS to share information, resources and expertise could lead to its success in New Zealand.

ii. Investigating the current legal framework and identifying opportunities to promote changes to policies and procedures that are consistent with the strategy.

The regulatory environment has not kept pace with telemedicine technology as indicated by the telemedicine literature (Edelstein, 1999). This issue relates in large to countries such as the U.S where legal and licensure are reported as major impediments to the large-scale diffusion of telemedicine across the different states as indicated earlier.

On the other hand, revisiting the current legal framework in New Zealand could prove useful in addressing the intervening nature of the telemedicine technology in healthcare practices and how to regulate the telemedicine encounters between the specialist and the patient (i.e., protocol). Misdiagnosis due to error or limitation in the telemedicine technology itself could raise many legal concerns amongst patients and HHS in New Zealand. Other issues pertaining to patient's security and privacy are very important and needs to be addressed as well. The use of encryption in case of using digital technology is suggested to protect the patient's data before, during and after any telemedicine encounter or transmission of data. Keeping the recorded videocassettes in a safe and protected place is essential.

iii. Examining ways in which consumers are able to access information, which enables them to make choices and exercise rights appropriately.

Telemedicine provide new opportunities to HHS as highlighted in Table 1 above. The Internet could help a lot in this regard and the amount of medical information available on the Internet provides rich information about diseases, treatment, and different preventative procedures. The impact of the WWW on patient's education has been termed an important research area in recent research (Harris et al., 2001). Coile (2000) found that in 1998 more than 18 million Americans went online seeking health information and advice and reported many eCommerce opportunities in the health field, which range from information display and advertising to online commercial transactions and payments. The author found that some healthcare providers are supplying health advice online and even prescribing pharmaceuticals for a fee despite the lack of a regulatory system in place (e.g., Viagra). Internet services could provide valuable surrogates to telemedicine encounters. Internet-based telemedicine may become a reality in the near future as a cost-effective method in seeing remote patients, obtaining patient information, case management and monitoring and in providing remote medical consultation (Coile, 2000). One concern here is the lack of security over the public telephone lines where introducing virtual private networks (VPN) to encrypt communications and messages over the Internet could solve this problem easily. Issues like secrecy, integrity, necessity and non-repudiation are some of the security threats. Thus, introducing a security policy that covers both the physical and the digital aspects of the telemedicine technology in healthcare organisations should protect the interests of HHS and patients.

Despite the limited use of WWW or email by rural residents, recent research found that more people were willing to use the WWW component of the telemedicine workstation more than the e-mail component (Harris et al., 2001). They found over half of the respondents (66%) did not utilize e-mail during the three-month trial period and 35% of the respondents did not utilize the WWW. Respondents indicated that they did not perceive e-mail to be useful. Respondents who did not use the WWW indicated that they did not intend to use the WWW nor did they have the time to use it.

With the continued development in telemedicine and telecommunication technology (e.g., Web television, voice/video over IP), it is expected that telemedicine will play a vital role in providing medical care to individual patients at their home (Josey & Gustke, 1999). Hence, healthcare providers could mass-customise their medical services to suit the individual needs of global patients. There are different appropriate technologies for this

type of service. Systems that work with a stethoscope for patients with heart diseases that require cardiac and pulmonary auscultation are available right now. A respiratory patient may require the stethoscope and a clear picture of the patient to enable the nurse to read a pulse oximeter or peak flow meter. Patients suffering from diabetes would require a stopmotion video in order to read the insulin dosage in a syringe (Josey & Gustke, 1999). With the appearance of exciting new instruments and prototypes such as electronic stethoscopes, odoscopes, opthalmascopes, palpation sensory transmitting gloves, and others further support the future success of the telemedicine technology (Wayman, 1994).

iv. Investigating opportunities to encourage providers to subscribe to appropriate standards (e.g., outcome, measures) and to publish information about their compliance with such standards.

As indicated earlier, more cooperation is needed between the different HHS in New Zealand in order to share experiences and eliminate waste. This is especially important as each HHS provide similar range of medical services to its community.

On the other hand, there are no clear standards or guidelines for the development and implementation of telemedicine systems and networks. For example, many professionals and researchers are still arguing about which analog-to-digital (code/decode[3]) technology will become the standard. There are even doubts about the reliability of the operational aspect of the whole video conferencing system in a real situation including the communication device (bridge) and channel (Al-Qirim, 2003a, 2004). The different manufacturers of the video conferencing equipment have their own standards in designing and manufacturing their own equipment, which makes the job of integrating heterogeneous equipment together in a fully networked manner, not an easy task. In certain countries such as the U.S., it is required to approve some telemedicine hardware and software by the Food and Drug Administration (FDA) before allowing its use in healthcare (Edelstein, 1999).

Another important issue is the adoption of standard protocols in scheduling and in conducting the telemedicine encounters with remote patients, physicians, and administration staff. Maintaining a patient record system in parallel with telemedicine encounters is important as well. It should be emphasised here that unless the different HHS, even at a supplementary level, treats telemedicine as one of the strategic tools of healthcare delivery it is highly unlikely to be taken seriously by medical staff. It should be integrated fully within the other medical portfolio provided by the different HHS. Keeping a logbook of the different encounters, recording the encounters, even the availability of other medical staff to take notes and transcribe the conversation between the doctor and the patients are highly envisaged here. These policies should be built within the quality and the risk management programs of the different HHS as discussed above. Policies for admission and discharge procedures, patient safety and privacy, infection control, equipment malfunction, and use of quality indicators to measure outcomes are only some of the examples (Josey & Gustke, 1999).

It should not be left as optional tool to specialist to use telemedicine or not because specialist would chose the easiest way and the one they know best, their earlier practices which is based on one-on-one practices. Telemedicine eradicates traditional ways in seeing patients and hence, requires a new way of thinking and a change in the mindset of physicians. Telemedicine is not an easy solution (Hu et al., 1999) and requires an extra effort. Unless telemedicine is embedded in the strategic plan of the different HHS, it is highly unlikely to realise its full benefits. Most importantly, telemedicine should integrate and coexist with other information-based systems in the hospital to provide seamless and

[3] The manufacturers of the video conferencing equipment consider this proprietary and niche.

integrated medical care to patients. Leaders in the telemedicine field say that telemedicine must include many new information processing technologies such as those that provide the physician access and use of advanced knowledge databases to diagnose and treat patients (Wayman, 1994; Perednia & Allen, 1995).

v. Developing mechanisms to encourage the use of appropriate information management processes and technology by healthcare providers.

Many researchers still think that the telemedicine technology has not achieved sufficient quality for healthcare provision and decision-making (Josey & Gustke, 1999). However, there are many advantages to consider. As discussed earlier, telemedicine provides a new parallel to existing medical practices and hence, introduces new sets of roles, processes and procedure which needs to be addressed. For example, computer applications in health services delivery fall into three general categories: (1) clinical (or medical) information systems involve the organisation processing, storage, and retrieval of information to support patient care activities; (2) administration information systems are designed to assist in carrying out financial and administrative support activities, such as payroll, patient accounting, materials management, and office automation; and (3) executive decision support systems provide information and analytical tools to support managerial decision-making in health services organisations (Austin, 1992). Telemedicine applications could assist in fulfilling most of the three areas. Indeed, using telemedicine visits to augment traditional medical visits rather than replacing them has been suggested by recent research (Al-Qirim, 2004a; Josey & Gustke, 1999). Indeed, in addition to its effectiveness as a medical tool, telemedicine represent an efficient vehicle for conducting administrative and clinical meetings and training. Unlike earlier practices and medical processes, telemedicine represents a new concept in seeing patients and other activities which requires a change in the mindset of healthcare providers.

Introducing an appropriate telemedicine technology along with an adequate protocol to coordinate sessions and interrelationships with other traditional medical processes in place should produce many advantages. Indeed, telemedicine could revolutionise existing practices and processes in place.

vi. Looking at ways to ensure compliance with the strategy by Crown-owned agencies.

In addition to encouraging cooperation between the different HHS in New Zealand, there is a need to monitor progress. This is very important from the HHS and from the government perspectives, as it could be a very challenging to strategists. Above all, there should be a real will to establish such national telemedicine initiative before governing it. For example, one central body or entity could be suggested here to govern and to monitor progress and compliance with the telemedicine strategy (being part of the overall HIS strategy). This role points in the direction of the government (i.e., MoH) in taking this responsibility. This is in part because MoH is the main funder to HHS. As indicated earlier, there is a lack of coordination between the different HHS in New Zealand and this further justifies the government role in championing telemedicine adoption and diffusion in New Zealand.

Recently, there has been an attempt by Starship Children's Hospital (SCH) to establish a national tele-paediatric network utilising the existing/introduced video conferencing equipment in the 23 HHS in New Zealand. The researcher followed this project closely and observed that such an attempt was not that easy and took long time to coordinate activities across the 23 different HHS and the committee established to look after this project. SCH hired a technologist to take the responsibility of initiating the project and to manage the coordination activities. Indeed, this is a very difficult task, as the technologist

has to deal with different hurdles (organisational (e.g., political) and technological (e.g., heterogeneous/old equipment)). It is worth investigating the outcomes of this project.

vii. Promoting educational and research initiatives that reflect an understanding of health and disability support services information management issues.

The implication here is twofold. Initially, the absence of knowledgeable users of health information is a potentially serious drawback to the implementation of any future plans and will need to be addressed by a process of education and in-service training and making use of distance learning technology (NZHIS, 1996), where telemedicine fits best in this scenario as discussed earlier. Telemedicine could be used to conduct training session to remote healthcare users (doctors, nurses, medical staff, students, etc.). This could provide flexibility and cost savings.

Secondly, as for the telemedicine technology itself, recent research found the telemedicine technology not easy to use by physicians (Hu et al., 1999) which highlights the importance of providing appropriate training and coaching of the technology before deploying it. Indeed conducting different training programmes at different levels aiming at increasing the awareness of the telemedicine technology and its use could assist in increasing its acceptance by the HHS community in New Zealand (Al-Qirim, 2003a, 2004).

viii. Developing appropriate case-mix and other tools for understanding health and disability sector outputs.

As discussed above, in running the telemedicine encounters in parallel to existing medical practices this could introduce different information for triangulation purposes. In a worst-case scenario, telemedicine could supplement healthcare delivery by providing second opinion to cases in rural areas.

ix. The need for leadership in the health and disability information area was one of the most consistent themes identified by the majority of the various stakeholders (NZHIS, 1996).

In an environment that consists of many autonomous or semi-autonomous entities, there is a great deal of potential for fragmentation in coordination and in healthcare provision. At the same time there was some concern amongst stakeholders (above) that the leadership should not be unduly influenced from any body or HHS. The implication here is twofold. Initially, the role of the government (MoH) has been emphasised earlier. Secondly, the need for champions inside the HHS itself is highly emphasised in this research. Recent research (Al-Qirim, 2004b) stressed the need for the intertwined roles of both the clinical and the administrative champions in order for telemedicine to succeed in HHS in New Zealand.

5 Discussion And Conclusion

As highlighted in this research, telemedicine could be a viable medical tool in healthcare delivery at different levels of sophistication. Telemedicine introduces many advantages and at the same time faces many challenges. It is worth mentioning here that how healthcare professionals view the different SWOT of telemedicine is a matter that relates to the healthcare professional him/herself (i.e., technology avoidance), healthcare organisations (i.e., culture), the organisation's close micro (patients, competitors) and broad macro (political, economical, social and technological) forces. The government's strategy discussed various aspects pertaining to the economical situation facing HHS and

looked at different organisational (lack of cooperation) and social (privacy) impediments facing the broad IS strategy. This research attempted to accumulate sufficient knowledge around telemedicine as a technology and as an enabler for healthcare delivery. However, drafting the telemedicine strategy in this research was not possible nor it was an objective. The research showed how this task was very complex (i.e., Starship HHS) and indeed, requires the collaboration of different interested parties in the proposed national telemedicine project. What this research has revealed that realising the full IS strategy in HHS in New Zealand and maybe elsewhere is not that simple. Indeed, breaking this strategy into smaller strategic building blocks (as proposed by the introduction of telemedicine in this research) could make the task of realising this comprehensive IS strategy a feasible one. The research investigated some of the aspects highlighted above but at the same time, it raises here the importance of expanding on the remaining forces by any future research. Issues like the political environment (regulatory) and the laid technological infrastructure worth investigating and could raise important findings.

Telemedicine represents a great opportunity for healthcare providers in New Zealand to network and to provide integrated healthcare and administrative services to rural areas specifically. This could provide important surrogates to the different gaps existing in the IS strategy of the different HHS in New Zealand. The New Zealand situation is quite interesting and do favours the introduction of telemedicine. For example, New Zealand's small area and population (3.82 Million) (NZStat, 2001) could lessen the impact of many of the big challenges that hinder telemedicine adoption in countries such as the US. Issues like licensure and reimbursement are major impediments in the US but not in New Zealand. There is one legal system in New Zealand and hence, interstate legalities and boundaries are large issues in the US but not in New Zealand. New Zealand has a sophisticated telecommunication (networks, mobile) infrastructure, which could serve the large-scale diffusion of telemedicine across the different HHS adequately. Creating a national strategic plan aiming at identifying opportunities with respect to speciality-care, rural coverage and medical needs, and other administrative objectives could assist in driving the health sector forward and in providing fast and quality care to rural patients in the first place and to all New Zealanders eventually. Creating this integrated telemedicine network amongst the different HHS could prove viable to healthcare delivery in New Zealand, which is hindered by severe shortages in specialist staff (brain-drain syndrome).

Looking at Al-Qirim's (2003a, 2004a) findings in New Zealand, it could be argued here that most of the hindrances in adopting and using telemedicine emanate from the specialists themselves and from the organisation (HHS). For example, as a precursor to adoption, it is important to identify the particular advantages sought from telemedicine taking into consideration the adoption context and the actual needs of the different HHS (Al-Qirim, 2003b). Providing a balance between tangible and intangible benefits with respect to the wellbeing of humans and the quality healthcare delivery is highly envisaged here. If the costs involved in adopting and running the telemedicine project were not planned well, the whole project could be brought to a complete halt. Considering issues such as running costs and hidden costs need to be identified earlier on. Issues pertaining to the complexity of the technology and to its compatibility with the physician's working environment needs to be addressed earlier on, with more emphasis put on the latter as it could prove detrimental to the whole success of the telemedicine project (Al-Qirim, 2003b). Therefore, providing a framework (e.g., training programmes, workshops, seminars, motivation) where physicians are encouraged to accept and use the technology in providing healthcare services to patients and to other rural physicians is highly stressed here. Thus, addressing these perspectives could lead to telemedicine success in New Zealand. At the national levels, the lack of coordination and cooperation between the different HHS in New Zealand needs to be resolved in order for this integration to succeed. Policymakers in New Zealand could benefit from the above guidelines to devise

policies aiming at assimilating the above gaps with respect to telemedicine adoption and integration in HHS.

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